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SEQUENCE LISTING

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<120> METHODS FOR IDENTIFYING AGENTS WHICH
ALTER HISTONE PROTEIN ACETYLATION, DECREASE AGING, INCREASE
LIFESPAN

<130> 0050.1618-000

<140> 09/461,580

<141> 1999-12-15

<160> 35

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 737

<212> PRT

<213> Mus musculus

<400> 1

Met	Ala	Asp	Glu	Val	Ala	Leu	Ala	Leu	Gln	Ala	Ala	Gly	Ser	Pro	Ser
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			20					25					30		
Arg	Lys	Arg	Pro	Arg	Arg	Asp	Gly	Pro	Gly	Leu	Gly	Arg	Ser	Pro	Gly
		35					40					45			
Glu	Pro	Ser	Ala	Ala	Val	Ala	Pro	Ala	Ala	Ala	Gly	Cys	Glu	Ala	Ala
		50				55					60				
Ser	Ala	Ala	Ala	Pro	Ala	Ala	Leu	Trp	Arg	Glu	Ala	Ala	Gly	Ala	Ala
65					70				75					80	
Ala	Ser	Ala	Glu	Arg	Glu	Ala	Pro	Ala	Thr	Ala	Val	Ala	Gly	Asp	Gly
				85					90					95	
Asp	Asn	Gly	Ser	Gly	Leu	Arg	Arg	Glu	Pro	Arg	Ala	Ala	Asp	Asp	Phe
			100					105					110		
Asp	Asp	Asp	Glu	Gly	Glu	Glu	Glu	Asp	Glu	Ala	Ala	Ala	Ala	Ala	Ala
		115					120					125			
Ala	Ala	Ala	Ile	Gly	Tyr	Arg	Asp	Asn	Leu	Leu	Leu	Thr	Asp	Gly	Leu
		130				135					140				
Leu	Thr	Asn	Gly	Phe	His	Ser	Cys	Glu	Ser	Asp	Asp	Asp	Asp	Arg	Thr
145					150					155				160	
Ser	His	Ala	Ser	Ser	Ser	Asp	Trp	Thr	Pro	Arg	Pro	Arg	Ile	Gly	Pro
				165					170					175	
Tyr	Thr	Phe	Val	Gln	Gln	His	Leu	Met	Ile	Gly	Thr	Asp	Pro	Arg	Thr
			180				185					190			
Ile	Leu	Lys	Asp	Leu	Leu	Pro	Glu	Thr	Ile	Pro	Pro	Pro	Glu	Leu	Asp
		195					200					205			
Asp	Met	Thr	Leu	Trp	Gln	Ile	Val	Ile	Asn	Ile	Leu	Ser	Glu	Pro	Pro
		210				215					220				
Lys	Arg	Lys	Lys	Arg	Lys	Asp	Ile	Asn	Thr	Ile	Glu	Asp	Ala	Val	Lys
225					230				235					240	
Leu	Leu	Gln	Glu	Cys	Lys	Lys	Ile	Ile	Val	Leu	Thr	Gly	Ala	Gly	Val
				245					250					255	
Ser	Val	Ser	Cys	Gly	Ile	Pro	Asp	Phe	Arg	Ser	Arg	Asp	Gly	Ile	Tyr

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Ala	Arg	Leu	Ala	Val	Asp	Phe	Pro	Asp	Leu	Pro	Asp	Pro	Gln	Ala	Met
		275					280					285			
Phe	Asp	Ile	Glu	Tyr	Phe	Arg	Lys	Asp	Pro	Arg	Pro	Phe	Phe	Lys	Phe
	290					295					300				
Ala	Lys	Glu	Ile	Tyr	Pro	Gly	Gln	Phe	Gln	Pro	Ser	Leu	Cys	His	Lys
305					310					315					320
Phe	Ile	Ala	Leu	Ser	Asp	Lys	Glu	Gly	Lys	Leu	Leu	Arg	Asn	Tyr	Thr
				325					330					335	
Gln	Asn	Ile	Asp	Thr	Leu	Glu	Gln	Val	Ala	Gly	Ile	Gln	Arg	Ile	Leu
			340					345					350		
Gln	Cys	His	Gly	Ser	Phe	Ala	Thr	Ala	Ser	Cys	Leu	Ile	Cys	Lys	Tyr
	355					360					365				
Lys	Val	Asp	Cys	Glu	Ala	Val	Arg	Gly	Asp	Ile	Phe	Asn	Gln	Val	Val
	370					375					380				
Pro	Arg	Cys	Pro	Arg	Cys	Pro	Ala	Asp	Glu	Pro	Leu	Ala	Ile	Met	Lys
385					390					395					400
Pro	Glu	Ile	Val	Phe	Phe	Gly	Glu	Asn	Leu	Pro	Glu	Gln	Phe	His	Arg
				405					410					415	
Ala	Met	Lys	Tyr	Asp	Lys	Asp	Glu	Val	Asp	Leu	Leu	Ile	Val	Ile	Gly
		420					425					430			
Ser	Ser	Leu	Lys	Val	Arg	Pro	Val	Ala	Leu	Ile	Pro	Ser	Ser	Ile	Pro
		435					440					445			
His	Glu	Val	Pro	Gln	Ile	Leu	Ile	Asn	Arg	Glu	Pro	Leu	Pro	His	Leu
	450					455					460				
His	Phe	Asp	Val	Glu	Leu	Leu	Gly	Asp	Cys	Asp	Val	Ile	Ile	Asn	Glu
465					470					475					480
Leu	Cys	His	Arg	Leu	Gly	Gly	Glu	Tyr	Ala	Lys	Leu	Cys	Cys	Asn	Pro
			485						490					495	
Val	Lys	Leu	Ser	Glu	Ile	Thr	Glu	Lys	Pro	Pro	Arg	Pro	Gln	Lys	Glu
		500						505					510		
Leu	Val	His	Leu	Ser	Glu	Leu	Pro	Thr	Pro	Leu	His	Ile	Ser	Glu	
		515					520					525			
Asp	Ser	Ser	Ser	Pro	Glu	Arg	Thr	Val	Pro	Gln	Asp	Ser	Ser	Val	Ile
	530					535					540				
Ala	Thr	Leu	Val	Asp	Gln	Ala	Thr	Asn	Asn	Asn	Val	Asn	Asp	Leu	Glu
545					550					555					560
Val	Ser	Glu	Ser	Ser	Cys	Val	Glu	Glu	Lys	Pro	Gln	Glu	Val	Gln	Thr
			565						570					575	
Ser	Arg	Asn	Val	Glu	Asn	Ile	Asn	Val	Glu	Asn	Pro	Asp	Phe	Lys	Ala
		580						585					590		
Val	Gly	Ser	Ser	Thr	Ala	Asp	Lys	Asn	Glu	Arg	Thr	Ser	Val	Ala	Glu
		595					600					605			
Thr	Val	Arg	Lys	Cys	Trp	Pro	Asn	Arg	Leu	Ala	Lys	Glu	Gln	Ile	Ser
	610					615						620			
Lys	Arg	Leu	Glu	Gly	Asn	Gln	Tyr	Leu	Phe	Val	Pro	Pro	Asn	Arg	Tyr
625					630					635					640
Ile	Phe	His	Gly	Ala	Glu	Val	Tyr	Ser	Asp	Ser	Glu	Asp	Asp	Val	Leu
				645					650					655	
Ser	Ser	Ser	Ser	Cys	Gly	Ser	Asn	Ser	Asp	Ser	Gly	Thr	Cys	Gln	Ser
		660						665				670			
Pro	Ser	Leu	Glu	Glu	Pro	Leu	Glu	Asp	Glu	Ser	Glu	Ile	Glu	Glu	Phe
		675					680					685			
Tyr	Asn	Gly	Leu	Glu	Asp	Asp	Thr	Glu	Arg	Pro	Glu	Cys	Ala	Gly	Gly
	690					695					700				
Ser	Gly	Phe	Gly	Ala	Asp	Gly	Gly	Asp	Gln	Glu	Val	Val	Asn	Glu	Ala
705					710					715					720
Ile	Ala	Thr	Arg	Gln	Glu	Leu	Thr	Asp	Val	Asn	Tyr	Pro	Ser	Asp	Lys
				725					730					735	

Ser

<210> 2
 <211> 272
 <212> PRT
 <213> *Saccharomyces cerevisiae*

<400> 2
 Ile Asn Lys Val Leu Cys Thr Arg Leu Arg Leu Ser Asn Phe Phe Thr
 1 5 10 15
 Ile Asp His Phe Ile Gln Lys Leu His Thr Ala Arg Lys Ile Leu Val
 20 25 30
 Leu Thr Gly Ala Gly Val Ser Thr Ser Leu Gly Ile Pro Asp Phe Arg
 35 40 45
 Ser Ser Glu Gly Phe Tyr Ser Lys Ile Lys His Leu Gly Leu Asp Asp
 50 55 60
 Pro Gln Asp Val Phe Asn Tyr Asn Ile Phe Met His Asp Pro Ser Val
 65 70 75 80
 Phe Tyr Asn Ile Ala Asn Met Val Leu Pro Pro Glu Lys Ile Tyr Ser
 85 90 95
 Pro Leu His Ser Phe Ile Lys Met Leu Gln Met Lys Gly Lys Leu Leu
 100 105 110
 Arg Asn Tyr Thr Gln Asn Ile Asp Asn Leu Glu Ser Tyr Ala Gly Ile
 115 120 125
 Ser Thr Asp Lys Leu Val Gln Cys His Gly Ser Phe Ala Thr Ala Thr
 130 135 140
 Cys Val Thr Cys His Trp Asn Leu Pro Gly Glu Arg Ile Phe Asn Lys
 145 150 155 160
 Ile Arg Asn Leu Glu Leu Pro Leu Cys Pro Tyr Cys Tyr Lys Lys Arg
 165 170 175
 Arg Glu Tyr Phe Pro Glu Gly Tyr Asn Asn Lys Val Gly Val Ala Ala
 180 185 190
 Ser Gln Gly Ser Met Ser Glu Arg Pro Pro Tyr Ile Leu Asn Ser Tyr
 195 200 205
 Gly Val Leu Lys Pro Asp Ile Thr Phe Phe Gly Glu Ala Leu Pro Asn
 210 215 220
 Lys Phe His Lys Ser Ile Arg Glu Asp Ile Leu Glu Cys Asp Leu Leu
 225 230 235 240
 Ile Cys Ile Gly Thr Ser Leu Lys Val Ala Pro Val Ser Glu Ile Val
 245 250 255
 Asn Met Val Pro Ser His Val Pro Gln Val Leu Ile Asn Arg Asp Pro
 260 265 270

<210> 3
 <211> 267
 <212> PRT
 <213> *Saccharomyces cerevisiae*

<400> 3
 Ile Asn Lys Val Leu Ser Thr Arg Leu Arg Leu Pro Asn Phe Asn Thr
 1 5 10 15
 Ile Asp His Phe Thr Ala Thr Leu Arg Asn Ala Lys Lys Ile Leu Val
 20 25 30
 Leu Thr Gly Ala Gly Val Ser Thr Ser Leu Gly Ile Pro Asp Phe Arg
 35 40 45

Ser Ser Glu Gly Phe Tyr Ser Lys Ile Arg His Leu Gly Leu Glu Asp
 50 55 60
 Pro Gln Asp Val Phe Asn Leu Asp Ile Phe Leu Gln Asp Pro Ser Val
 65 70 75 80
 Phe Tyr Asn Ile Ala His Met Val Leu Pro Pro Glu Asn Met Tyr Ser
 85 90 95
 Pro Leu His Ser Phe Ile Lys Met Leu Gln Asp Lys Gly Lys Leu Leu
 100 105 110
 Arg Asn Tyr Thr Gln Asn Ile Asp Asn Leu Glu Ser Tyr Ala Gly Ile
 115 120 125
 Asp Pro Asp Lys Leu Val Gln Cys His Gly Ser Phe Ala Thr Ala Ser
 130 135 140
 Cys Val Thr Cys His Trp Gln Ile Pro Gly Glu Lys Ile Phe Glu Asn
 145 150 155 160
 Ile Arg Asn Leu Glu Leu Pro Leu Cys Pro Tyr Cys Tyr Gln Lys Arg
 165 170 175
 Lys Gln Tyr Phe Pro Met Ser Asn Gly Asn Asn Thr Val Gln Thr Asn
 180 185 190
 Ile Asn Phe Asn Ser Pro Ile Leu Lys Ser Tyr Gly Val Leu Lys Pro
 195 200 205
 Asp Met Thr Phe Phe Gly Glu Ala Leu Pro Ser Arg Phe His Lys Thr
 210 215 220
 Ile Arg Lys Asp Ile Leu Glu Cys Asp Leu Leu Ile Cys Ile Gly Thr
 225 230 235 240
 Ser Leu Lys Val Ala Pro Val Ser Glu Ile Val Asn Met Val Pro Ser
 245 250 255
 His Val Pro Gln Ile Leu Ile Asn Arg Asp Met
 260 265

<210> 4
 <211> 245
 <212> PRT
 <213> Mus musculus

<400> 4
 Val Ile Asn Ile Leu Ser Glu Pro Pro Lys Arg Lys Lys Arg Lys Asp
 1 5 10 15
 Ile Asn Thr Ile Glu Asp Ala Val Lys Leu Leu Gln Glu Cys Lys Lys
 20 25 30
 Ile Ile Val Leu Thr Gly Ala Gly Val Ser Val Ser Cys Gly Ile Pro
 35 40 45
 Asp Phe Arg Ser Arg Asp Gly Ile Tyr Ala Arg Leu Ala Val Asp Phe
 50 55 60
 Pro Asp Leu Pro Asp Pro Gln Ala Met Phe Asp Ile Glu Tyr Phe Arg
 65 70 75 80
 Lys Asp Pro Arg Pro Phe Phe Lys Phe Ala Lys Glu Ile Tyr Pro Gly
 85 90 95
 Gln Phe Gln Pro Ser Leu Cys His Lys Phe Ile Ala Leu Ser Asp Lys
 100 105 110
 Glu Gly Lys Leu Leu Arg Asn Tyr Thr Gln Asn Ile Asp Thr Leu Glu
 115 120 125
 Gln Val Ala Gly Ile Gln Arg Ile Leu Gln Cys His Gly Ser Phe Ala
 130 135 140
 Thr Ala Ser Cys Leu Ile Cys Lys Tyr Lys Val Asp Cys Glu Ala Val
 145 150 155 160
 Arg Gly Asp Ile Phe Asn Gln Val Val Pro Arg Cys Pro Arg Cys Pro
 165 170 175

Ala Asp Glu Pro Leu Ala Ile Met Lys Pro Glu Ile Val Phe Phe Gly
 180 185 190
 Glu Asn Leu Pro Glu Gln Phe His Arg Ala Met Lys Tyr Asp Lys Asp
 195 200 205
 Glu Val Asp Leu Leu Ile Val Ile Gly Ser Ser Leu Lys Val Arg Pro
 210 215 220
 Val Ala Leu Ile Pro Ser Ser Ile Pro His Glu Val Pro Gln Ile Leu
 225 230 235 240
 Ile Asn Arg Glu Pro
 245

<210> 5

<211> 237

<212> PRT

<213> Escherichia coli

<400> 5

Met Met Glu Asn Pro Arg Val Leu Val Leu Thr Gly Ala Gly Ile Ser
 1 5 10 15
 Ala Glu Ser Gly Ile Arg Thr Phe Arg Ala Ala Asp Gly Leu Trp Glu
 20 25 30
 Glu His Arg Val Glu Asp Val Ala Thr Pro Glu Gly Phe Ala Arg Asn
 35 40 45
 Pro Gly Leu Val Gln Thr Phe Tyr Asn Ala Arg Arg Gln Gln Leu Gln
 50 55 60
 Gln Pro Glu Ile Gln Pro Asn Ala Ala His Leu Ala Leu Ala Asn Leu
 65 70 75 80
 Lys Lys Arg Leu Ala Ile Ala Phe Leu Leu Val Thr Gln Asn Ile Asp
 85 90 95
 Asn Leu His Glu Arg Ala Gly Asn Arg Asn Ile Ile Gln Met His Gly
 100 105 110
 Glu Leu Leu Lys Val Arg Cys Ser Gln Ser Gly Gln Ile Leu Glu Trp
 115 120 125
 Asn Gly Asp Val Met Pro Glu Asp Lys Cys His Cys Cys Gln Phe Pro
 130 135 140
 Ala Pro Leu Arg Pro His Val Val Trp Phe Gly Glu Met Pro Leu Gly
 145 150 155 160
 Met Asp Glu Ile Tyr Met Ala Leu Ser Met Ala Asp Ile Phe Ile Ala
 165 170 175
 Ile Gly Thr Ser Gly His Val Tyr Pro Ala Ala Gly Phe Val His Glu
 180 185 190
 Ala Lys Leu His Gly Ala His Thr Val Glu Leu Asn Leu Glu Pro Ser
 195 200 205
 Gln Val Gly Asn Glu Phe Glu Glu Lys His Tyr Gly Pro Ala Ser Gln
 210 215 220
 Val Val Pro Glu Phe Val Asp Lys Phe Leu Lys Gly Leu
 225 230 235

<210> 6

<211> 21

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic Peptide

<400> 6

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Ala Arg Thr Lys Gln Thr Ala Arg Lys Ser Thr Gly Gly Lys Ala Pro
1 5 10 15
Arg Lys Gln Leu Cys
20

<210> 7
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 7
Ser Gly Arg Gly Lys Gly Gly Lys Gly Leu Gly Lys Gly Gly Ala Lys
1 5 10 15
Arg His Arg Cys
20

<210> 8
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 8
Ala Gly Gly Lys Gly Gly Lys Gly Met Gly Lys Val Gly Ala Lys Arg
1 5 10 15
His Ser Cys

<210> 9
<211> 128
<212> PRT
<213> Mus musculus

<400> 9
Ile Val Leu Thr Gly Ala Gly Val Ser Val Ser Cys Gly Ile Pro Asp
1 5 10 15
Phe Arg Ser Arg Asp Gly Ile Tyr Ala Arg Leu Ala Val Asp Phe Pro
20 25 30
Asp Leu Pro Asp Pro Gln Ala Met Phe Asp Ile Glu Tyr Phe Arg Lys
35 40 45
Asp Pro Arg Pro Phe Phe Lys Phe Ala Lys Glu Ile Tyr Pro Gly Gln
50 55 60
Phe Gln Pro Ser Leu Cys His Lys Phe Ile Ala Leu Ser Asp Lys Glu
65 70 75 80
Gly Lys Leu Leu Arg Asn Tyr Thr Gln Asn Ile Asp Thr Leu Glu Gln
85 90 95
Val Ala Gly Ile Gln Arg Ile Leu Gln Cys His Gly Ser Phe Ala Thr
100 105 110
Ala Ser Cys Leu Ile Cys Lys Tyr Lys Val Asp Cys Glu Ala Val Arg
115 120 125

<210> 10
 <211> 128
 <212> PRT
 <213> *Saccharomyces cerevisiae*

<400> 10
 Leu Val Leu Thr Gly Ala Gly Val Ser Thr Ser Leu Gly Ile Pro Asp
 1 5 10 15
 Phe Arg Ser Ser Glu Gly Phe Tyr Ser Lys Ile Lys His Leu Gly Leu
 20 25 30
 Asp Asp Pro Gln Asp Val Phe Asn Tyr Asn Ile Phe Met His Asp Pro
 35 40 45
 Ser Val Phe Tyr Asn Ile Ala Asn Met Val Leu Pro Pro Glu Lys Ile
 50 55 60
 Tyr Ser Pro Leu His Ser Phe Ile Lys Met Leu Gln Met Lys Gly Lys
 65 70 75 80
 Leu Leu Arg Asn Tyr Thr Gln Asn Ile Asp Asn Leu Glu Ser Tyr Ala
 85 90 95
 Gly Ile Ser Thr Asp Lys Leu Val Gln Cys His Gly Ser Phe Ala Thr
 100 105 110
 Ala Thr Cys Val Thr Cys His Trp Asn Leu Pro Gly Glu Arg Ile Phe
 115 120 125

<210> 11
 <211> 336
 <212> PRT
 <213> *Saccharomyces cerevisiae*

<400> 11
 Ala Ile Asn Lys Val Leu Cys Thr Arg Leu Arg Leu Ser Asn Phe Phe
 1 5 10 15
 Thr Ile Asp His Phe Ile Gln Lys Leu His Thr Ala Arg Lys Ile Leu
 20 25 30
 Val Leu Thr Gly Ala Gly Val Ser Thr Ser Leu Gly Ile Pro Asp Phe
 35 40 45
 Arg Ser Ser Glu Gly Phe Tyr Ser Lys Ile Lys His Leu Gly Leu Asp
 50 55 60
 Asp Pro Gln Asp Val Phe Asn Tyr Asn Ile Phe Met His Asp Pro Ser
 65 70 75 80
 Val Phe Tyr Asn Ile Ala Asn Met Val Leu Pro Pro Glu Lys Ile Tyr
 85 90 95
 Ser Pro Leu His Ser Phe Ile Lys Met Leu Gln Met Lys Gly Lys Leu
 100 105 110
 Leu Arg Asn Tyr Thr Gln Asn Ile Asp Asn Leu Glu Ser Tyr Ala Gly
 115 120 125
 Ile Ser Thr Asp Lys Leu Val Gln Cys His Gly Ser Phe Ala Thr Ala
 130 135 140
 Thr Cys Val Thr Cys His Trp Asn Leu Pro Gly Glu Arg Ile Phe Asn
 145 150 155 160
 Lys Ile Arg Asn Leu Glu Leu Pro Leu Cys Pro Tyr Cys Tyr Lys Lys
 165 170 175
 Arg Arg Glu Tyr Phe Pro Glu Gly Tyr Asn Asn Lys Val Gly Val Ala
 180 185 190
 Ala Ser Gln Gly Ser Met Ser Glu Arg Pro Pro Tyr Ile Leu Asn Ser
 195 200 205
 Tyr Gly Val Leu Lys Pro Asp Ile Thr Phe Phe Gly Glu Ala Leu Pro
 210 215 220

Asn Lys Phe His Lys Ser Ile Arg Glu Asp Ile Leu Glu Cys Asp Leu
 225 230 235 240
 Leu Ile Cys Ile Gly Thr Ser Leu Lys Val Ala Pro Val Ser Glu Ile
 245 250 255
 Val Asn Met Val Pro Ser His Val Pro Gln Val Leu Ile Asn Arg Asp
 260 265 270
 Pro Val Lys His Ala Glu Phe Asp Leu Ser Leu Leu Gly Tyr Cys Asp
 275 280 285
 Asp Ile Ala Ala Met Val Ala Gln Lys Cys Gly Trp Thr Ile Pro His
 290 295 300
 Lys Lys Trp Asn Asp Leu Lys Asn Lys Asn Phe Lys Cys Gln Glu Lys
 305 310 315 320
 Asp Lys Gly Val Tyr Val Val Thr Ser Asp Glu His Pro Lys Thr Leu
 325 330 335

<210> 12
 <211> 327
 <212> PRT
 <213> Mus. musculus

<400> 12
 Val Ile Asn Ile Leu Ser Glu Pro Pro Lys Arg Lys Lys Arg Lys Asp
 1 5 10 15
 Ile Asn Thr Ile Glu Asp Ala Val Lys Leu Leu Gln Glu Cys Lys Lys
 20 25 30
 Ile Ile Val Leu Thr Gly Ala Gly Val Ser Val Ser Cys Gly Ile Pro
 35 40 45
 Asp Phe Arg Ser Arg Asp Gly Ile Tyr Ala Arg Leu Ala Val Asp Phe
 50 55 60
 Pro Asp Leu Pro Asp Pro Gln Ala Met Phe Asp Ile Glu Tyr Phe Arg
 65 70 75 80
 Lys Asp Pro Arg Pro Phe Phe Lys Phe Ala Lys Glu Ile Tyr Pro Gly
 85 90 95
 Gln Phe Gln Pro Ser Leu Cys His Lys Phe Ile Ala Leu Ser Asp Lys
 100 105 110
 Glu Gly Lys Leu Leu Arg Asn Tyr Thr Gln Asn Ile Asp Thr Leu Glu
 115 120 125
 Gln Val Ala Gly Ile Gln Arg Ile Leu Gln Cys His Gly Ser Phe Ala
 130 135 140
 Thr Ala Ser Cys Leu Ile Cys Lys Tyr Lys Val Asp Cys Glu Ala Val
 145 150 155 160
 Arg Gly Asp Ile Phe Asn Gln Val Val Pro Arg Cys Pro Arg Cys Pro
 165 170 175
 Ala Asp Glu Pro Leu Ala Ile Met Lys Pro Glu Ile Val Phe Phe Gly
 180 185 190
 Glu Asn Leu Pro Glu Gln Phe His Arg Ala Met Lys Tyr Asp Lys Asp
 195 200 205
 Glu Val Asp Leu Leu Ile Val Ile Gly Ser Ser Leu Lys Val Arg Pro
 210 215 220
 Val Ala Leu Ile Pro Ser Ser Ile Pro His Glu Val Pro Gln Ile Leu
 225 230 235 240
 Ile Asn Arg Glu Pro Leu Pro His Leu His Phe Asp Val Glu Leu Leu
 245 250 255
 Gly Asp Cys Asp Val Ile Ile Asn Glu Leu Cys His Arg Leu Gly Gly
 260 265 270
 Glu Tyr Ala Lys Leu Cys Cys Asn Pro Val Lys Leu Ser Glu Ile Thr
 275 280 285

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Glu Lys Pro Pro Arg Pro Gln Lys Glu Leu Val His Leu Ser Glu Leu
290 295 300
Pro Pro Thr Pro Leu His Ile Ser Glu Asp Ser Ser Ser Pro Glu Arg
305 310 315 320
Thr Val Pro Gln Asp Ser Ser
325

<210> 13
<211> 237
<212> PRT
<213> *Escherichia coli*

<400> 13
Met Met Glu Asn Pro Arg Val Leu Val Leu Thr Gly Ala Gly Ile Ser
1 5 10 15
Ala Glu Ser Gly Ile Arg Thr Phe Arg Ala Ala Asp Gly Leu Trp Glu
20 25 30
Glu His Arg Val Glu Asp Val Ala Thr Pro Glu Gly Pro Ala Arg Asn
35 40 45
Pro Gly Leu Val Gln Thr Phe Tyr Asn Ala Arg Arg Gln Gln Leu Gln
50 55 60
Gln Pro Glu Ile Gln Pro Asn Ala Ala His Leu Ala Leu Ala Asn Leu
65 70 75 80
Lys Lys Arg Leu Ala Ile Ala Phe Leu Leu Val Thr Gln Asn Ile Asp
85 90 95
Asn Leu His Glu Arg Ala Gly Asn Arg Asn Ile Ile Gln Met His Gly
100 105 110
Glu Leu Leu Lys Val Arg Cys Ser Gln Ser Gly Gln Ile Leu Glu Trp
115 120 125
Asn Gly Asp Val Met Pro Glu Asp Lys Cys His Cys Cys Gln Phe Pro
130 135 140
Ala Pro Leu Arg Pro His Val Val Trp Phe Gly Glu Met Pro Leu Gly
145 150 155 160
Met Asp Glu Ile Tyr Met Ala Leu Ser Met Ala Asp Ile Phe Ile Ala
165 170 175
Ile Gly Thr Ser Gly His Val Tyr Pro Ala Ala Gly Phe Val His Glu
180 185 190
Ala Lys Leu His Gly Ala His Thr Val Glu Leu Asn Leu Glu Pro Ser
195 200 205
Gln Val Gly Asn Glu Phe Glu Glu Lys His Tyr Gly Pro Ala Ser Gln
210 215 220
Val Val Pro Glu Phe Val Asp Lys Phe Leu Lys Gly Leu
225 230 235

<210> 14
<211> 106
<212> PRT
<213> *Saccharomyces cerevisiae*

<400> 14
Ile Leu Val Leu Thr Gly Ala Gly Val Ser Thr Ser Leu Gly Ile Pro
1 5 10 15
Asp Phe Arg Ser Ser Glu Gly Phe Tyr Ser Lys Ile Lys His Leu Gly
20 25 30
Leu Asp Asp Pro Gln Asp Val Phe Asn Tyr Asn Ile Phe Met His Asp
35 40 45

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Pro Ser Val Phe Tyr Asn Ile Ala Asn Met Val Leu Pro Pro Glu Lys
50 55 60
Ile Tyr Ser Pro Leu His Ser Phe Ile Lys Met Leu Gln Met Lys Gly
65 70 75 80
Lys Leu Leu Arg Asn Tyr Thr Gln Asn Ile Asp Asn Leu Glu Ser Tyr
85 90 95
Ala Gly Ile Ser Thr Asp Lys Leu Val Gln
100 105

<210> 15

<211> 106

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 15

Ile Leu Val Leu Thr Gly Ala Gly Val Ser Thr Ser Leu Gly Ile Pro
1 5 10 15
Asp Phe Arg Ser Ser Glu Gly Phe Tyr Ser Lys Ile Arg His Leu Gly
20 25 30
Leu Glu Asp Pro Gln Asp Val Phe Asn Leu Asp Ile Phe Leu Gln Asp
35 40 45
Pro Ser Val Phe Tyr Asn Ile Ala His Met Val Leu Pro Pro Glu Asn
50 55 60
Met Tyr Ser Pro Leu His Ser Phe Ile Lys Met Leu Gln Asp Lys Gly
65 70 75 80
Lys Leu Leu Arg Asn Tyr Thr Gln Asn Ile Asp Asn Leu Glu Ser Tyr
85 90 95
Ala Gly Ile Asp Pro Asp Lys Leu Val Gln
100 105

<210> 16

<211> 107

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 16

Val Ile Phe Met Val Gly Ala Gly Ile Ser Thr Ser Cys Gly Ile Pro
1 5 10 15
Asp Phe Arg Ser Pro Gly Thr Gly Leu Tyr His Asn Leu Ala Arg Leu
20 25 30
Lys Leu Pro Tyr Pro Glu Ala Val Phe Asp Val Asp Phe Phe Gln Ser
35 40 45
Asp Pro Leu Pro Phe Tyr Thr Leu Ala Lys Glu Leu Tyr Pro Gly Asn
50 55 60
Phe Arg Pro Ser Lys Phe His Tyr Leu Leu Lys Leu Phe Gln Asp Lys
65 70 75 80
Asp Val Leu Lys Arg Val Tyr Thr Gln Asn Ile Asp Thr Leu Glu Arg
85 90 95
Gln Ala Gly Val Lys Asp Asp Leu Ile Ile Glu
100 105

<210> 17

<211> 131

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 17

Ile	Ala	Cys	Leu	Thr	Gly	Ala	Gly	Ile	Ser	Cys	Asn	Ala	Gly	Ile	Pro
1				5				10						15	
Asp	Phe	Arg	Ser	Ser	Asp	Gly	Leu	Tyr	Asp	Leu	Val	Lys	Lys	Asp	Cys
			20					25					30		
Ser	Gln	Tyr	Trp	Ser	Ile	Lys	Ser	Gly	Arg	Glu	Met	Phe	Asp	Ile	Ser
		35					40					45			
Leu	Phe	Arg	Asp	Asp	Phe	Lys	Ile	Ser	Ile	Phe	Ala	Lys	Phe	Met	Glu
	50					55					60				
Arg	Leu	Tyr	Ser	Asn	Val	Gln	Leu	Ala	Lys	Pro	Thr	Lys	Thr	His	Lys
65					70				75					80	
Phe	Ile	Ala	His	Leu	Lys	Asp	Arg	Asn	Lys	Leu	Leu	Arg	Cys	Tyr	Thr
			85					90						95	
Gln	Asn	Ile	Asp	Gly	Leu	Glu	Glu	Ser	Ile	Gly	Leu	Thr	Leu	Ser	Asn
			100					105					110		
Arg	Lys	Leu	Pro	Leu	Thr	Ser	Phe	Ser	Ser	His	Trp	Lys	Asn	Leu	Asp
		115					120						125		
Val	Val	Gln													
		130													

<210> 18

<211> 117

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 18

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Gly	Lys	Asp	Leu	Phe	Asp	Tyr	Asn	Arg	Val	Tyr	Gly	Asp	Glu	Ser	Met
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Ser	Leu	Lys	Phe	Asn	Gln	Leu	Met	Val	Ser	Leu	Phe	Arg	Leu	Ser	Lys
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Asp	Gly	Arg	Leu	Leu	Arg	Leu	Tyr	Thr	Gln	Asn	Ile	Asp	Gly	Leu	Asp
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Thr	Gln	Leu	Pro	His	Leu	Ser	Thr	Asn	Val	Pro	Leu	Ala	Lys	Pro	Ile
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<211> 106

<212> PRT

<213> *Mus musculus*

<400> 19

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			20					25					30		
Pro	Asp	Leu	Pro	Asp	Pro	Gln	Ala	Met	Phe	Asp	Ile	Glu	Tyr	Phe	Arg
		35					40					45			
Lys	Asp	Pro	Arg	Pro	Phe	Phe	Lys	Phe	Ala	Lys	Glu	Ile	Tyr	Pro	Gly
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12/23

Gln Phe Gln Pro Ser Leu Cys His Lys Phe Ile Ala Leu Ser Asp Lys
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Glu Gly Lys Leu Leu Arg Asn Tyr Thr Gln Asn Ile Asp Thr Leu Glu
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<213> Mus musculus

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35 40 45
His Pro Glu Pro Phe Phe Ala Leu Ala Lys Glu Leu Tyr Pro Gly Gln
50 55 60
Phe Lys Pro Thr Ile Cys His Tyr Phe Ile Arg Leu Leu Lys Glu Lys
65 70 75 80
Gly Leu Leu Leu Arg Cys Tyr Thr Gln Asn Ile Asp Thr Leu Glu Arg
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Val Ala Gly Leu Glu Pro Gln Asp Leu Val Glu
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<213> Mus musculus

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35 40 45
Thr His Tyr Phe Leu Arg Leu Leu His Asp Lys Glu Leu Leu Leu Arg
50 55 60
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Ala Ser Lys Leu Val Glu
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<210> 22
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<213> Unknown

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<400> 22

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Ala Pro Lys Phe Asp Thr Thr Phe Glu Asn Ala Arg Pro Ser Lys Thr
      35           40           45
His Met Ala Leu Val Gln Leu Glu Arg Met Gly Phe Leu Ser Phe Leu
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Asp Lys Leu Ala Glu
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 <213> Unknown

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      20           25           30
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Pro Thr Gln His Thr Trp Leu
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 <213> Unknown

<220>
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Leu Ala Thr Pro Gln Ala Phe Ala Arg Asn Pro Ser Gln Val Trp Glu
      35           40           45
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<213> Mus musculus

<220>

<221> CDS

<222> (48)...(2261)

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Glu Val Ala Leu Ala Leu Gln Ala Ala Gly Ser Pro Ser Ala Ala Ala
      5                      10                      15

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Ser Gly Leu Arg Arg Glu Pro Arg Ala Ala Asp Asp Phe Asp Asp Asp
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Ser Ser Ser Asp Trp Thr Pro Arg Pro Arg Ile Gly Pro Tyr Thr Phe
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Leu Trp Gln Ile Val Ile Asn Ile Leu Ser Glu Pro Pro Lys Arg Lys	
215 220 225	
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Lys Arg Lys Asp Ile Asn Thr Ile Glu Asp Ala Val Lys Leu Leu Gln	
230 235 240	
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Glu Cys Lys Lys Ile Ile Val Leu Thr Gly Ala Gly Val Ser Val Ser	
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Cys Gly Ile Pro Asp Phe Arg Ser Arg Asp Gly Ile Tyr Ala Arg Leu	
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Ala Val Asp Phe Pro Asp Leu Pro Asp Pro Gln Ala Met Phe Asp Ile	
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Glu Tyr Phe Arg Lys Asp Pro Arg Pro Phe Phe Lys Phe Ala Lys Glu	
295 300 305	
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Pro Arg Cys Pro Ala Asp Glu Pro Leu Ala Ile Met Lys Pro Glu Ile	
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Val Phe Phe Gly Glu Asn Leu Pro Glu Gln Phe His Arg Ala Met Lys	
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Tyr Asp Lys Asp Glu Val Asp Leu Leu Ile Val Ile Gly Ser Ser Leu	
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 680 685 690

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 565 570 575
 Ser Arg Asn Val Glu Asn Ile Asn Val Glu Asn Pro Asp Phe Lys Ala
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 Thr Val Arg Lys Cys Trp Pro Asn Arg Leu Ala Lys Glu Gln Ile Ser
 610 615 620
 Lys Arg Leu Glu Gly Asn Gln Tyr Leu Phe Val Pro Pro Asn Arg Tyr
 625 630 635 640
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 Pro Ser Leu Glu Glu Pro Leu Glu Asp Glu Ser Glu Ile Glu Glu Phe
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 Asp Ser Asp Thr Glu Gly Gly Ala Thr Gly Gly Glu Ala Glu Met Asp
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 Phe Leu Arg Asn Leu Phe Thr Gln Thr Leu Gly Leu Gly Ser Gln Lys
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 Glu Arg Leu Leu Asp Glu Leu Thr Leu Glu Gly Val Thr Arg Tyr Met
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 Gln Ser Glu Arg Cys Arg Lys Val Ile Cys Leu Val Gly Ala Gly Ile
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 Ser Thr Ser Ala Gly Ile Pro Asp Phe Arg Ser Pro Ser Thr Gly Leu
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